Toward a Robust, Coordinated and Effective System of Technology and Knowledge Transfer in Transportation Research

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Technology and know-how transfer encompasses policies, practices and activities needed to facilitate the adoption of products or procedures by a user or group of users. Transfer of know-how produced by research and innovation activities is a means to directly affect improvements to the transportation system, leverage resources and maximize return on valuable research investments. The lack of robust, coordinated systems of technology and knowledge transfer leads to a waste of research dollars, and undermines the enterprise of research and innovation. Mainstreaming of research products and promoting their use is critical.

While there is a huge body of literature on technology transfer, in the transportation field[1] and in other disciplines, the shift to collaborative governance as a paradigm of leadership create new opportunities for significantly strengthening transfer of technologies and know-how across and within national borders. Collaboration and cross-fertilization among disciplines and sectors are a hallmark of 21st century organizational governance. It is dictated by the complexity of the problems we face in today's world and the constraints on resources which compel us to partner and collaborate to access and leverage resources and address complex problems. Furthermore, the explosion of Information and Communication Technologies open new frontiers of innovations and promises the realization of a vision of a borderless and inclusive system of knowledge transfer.

[1]See for example, Harder, B, Benke, R. (2006). NCHRP Synthesis 355 (2006). Transportation Technology Transfer: Successes, Challenges and Needs. National Cooperative Highway Research Program, Transportation Research Board; Washington, DC. https://books.google.com/books?id=LyuE5cu6V74C&printsec=frontcover#v=onepage&q&f=false

In this Special Issue, the authors address the question of how technology and knowledge transfer can be strengthened in the transportation research field from a system-level macro perspective, as well as from a practical micro-level angle.

Drawing on extensive expertise and analysis of the European transport research sector, Giannopoulos outlines the contour of a *European transport research training and know-how transfer system*. Based on his analysis of existing policies, initiatives and his examination of existing challenges and aspects of the current practices, he proposes a comprehensive and holistic know-how transfer system that would have the characteristics of viability and flexibility to address transport research transfer needs of the 21st century. He argues that the main elements of this system include top down and bottom up approaches to enabling the process and maximize the outcomes of technology and know how transfer. It would address the educational needs of the transportation researcher to equip him/her with the skills needed to effectively transfer the products of research. It would create a monitoring and evaluation entity to incentivize, coordinate and measure outcomes. Mechanisms for interaction and delivery of this vision need to be strengthened and need not only to leverage the latest innovative tools in Information and Communication Technologies (ICTs), but also to spur a cultural change in training and education.

Caillier Coco and LaChenaye's paper delve deep into how leveraging ICTs can be used successfully to deliver training and transfer know how to "a broad spectrum of the transportation workforce. They report on a research study that investigated where Immersive Virtual Learning Environment (IVLEs) can be used to train flag workers and prepare them for the challenges of their job and whether trainings using IVLEs work better than traditional classroom-based trainings. The study finds that the IVLEs provided a much more advantageous educational experience than a traditional classroom environment. Participants using IVLEs were able to experience applied "real-Life" simulations of occupational tasks much more effectively than their counterparts receiving the training through a traditional classroom experience. The IVLEs also provided an opportunity for participants to work at their own pace in ways that is more appropriate to their learning styles, past experiences and needs. The ability to repeat and self-correct and recreate numerous real life situations were benefits unique to IVLEs. Caillier Coco and LaChenaye conclude that "in terms of applications and value of IVLE technologies in transportation training, the potential for application and innovation is extensive."

Similarly, Lautala, Hass and Velat examine the development and initial outcomes of the High-Speed Rail Learning System (HSRLS), an online, multi-purpose education and knowledge sharing tool. The vision of this web-based portal is the development of an educational and training clearinghouse for high-speed rail. Its goal is to "connect teachers, trainers and students at the pre and post graduate levels and collect information on groups" interested in high-speed rail. The authors report a high cross-group interest in high rail information and the initial success of this online system is expanding and deepening its vision to developing a "warehouse of rail topics."

Together, the authors of this Special Issue take the reader to the next generation of know-how and knowledge transfer. Their collective vision of a more robust, coordinated, sustainable and effective system that fully harnesses the power of Information and Communication Technologies (ICTs) becomes more attainable than ever.